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RURAL-URBAN MIGRATION IN DEVELOPING COUNTRIES:

`A SURVEY OF THEORETICAL PREDICTIONS AND EMPIRICAL FINDINGS[*]

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Abstract

The migration of labor from rural to urban areas is an important part of the urbanization process in developing countries. Even though it has been the focus of abundant research over the past five decades, some key policy questions have not found clear answers yet. To what extent is internal migration a desirable phenomenon and under what circumstances? Should governments intervene and if so with what types of interventions? What should be their policy objectives? To shed light on these important issues, we survey the existing theoretical models and their conflicting policy implications, and discuss the policies that may be justified based on recent relevant empirical studies. A key limitation is that much of the empirical literature does not provide structural tests of the theoretical models, but only provides partial findings that can support or invalidate intuitions and in that sense support or invalidate the policy implications of the models. Our broad assessment of the literature is that migration can be beneficial or at least be turned into a beneficial phenomenon, so that in general migration restrictions are not desirable. We also identify some data issues and research topics which merit further investigation.

1 INTRODUCTION

In developing economies, structural changes often have profound spatial implications. The present survey focuses on labor-related migration from rural to urban areas, a general pattern which plays a central role in the urbanization process and is often viewed as the labor market adjustment to the inter sectoral shift in importance from agriculture to manufacturing and services.[1] Rural to urban migration has historically been an important part of the urbanization process and continues to be significant in scale, even though migration rates appear to have slowed down in some countries. Migration from rural areas accounted for at least half of all urban growth in Africa during the 1960s and 1970s and about 25% of urban growth in the 1980s and 1990s (Brockerhoff, 1995). In Brazil, at the peak of its urbanization process, it is estimated that over 20 million people moved from rural to urban areas between the 1950s and the 1970s. In comparison, 20.5 million people in India (30% of national urban growth) moved from rural to urban areas in the 1990s (Census of India, 2005).

[1] In this survey, we do not focus on amenity-based migration which explains the migration of students or of retired people. Nor do we focus on forced migration (due to war or civil unrest).

In this paper, we provide a policy-oriented survey of the research carried out on internal migration in developing countries over the past five decades. Many studies have focused on how internal migrants behave at different stages of the migration process. How do migrants prepare for migration? How do they migrate? What are the difficulties they face on arriving in urban areas? What links do they maintain with rural areas?

This review synthesizes the current state of knowledge concerning internal migration in developing countries. As far as the preparation phase is concerned, studies show that potential migrants invest in education before migrating, anticipating that human capital will be needed or better rewarded in the city (Kochar, 2004). They may also gather information about jobs from migrant networks (Roberts, 2001) or search for a job from their rural base (Banerjee, 1991), which reduces both the risk of temporary unemployment and the uncertainty on the returns to migration.

The migration decision has been shown to be selective. Migration mainly concerns young adults who are more likely to have a positive net expected return on migration due to their longer remaining life expectancy, or because social norms require that young adults migrate in search of a better life (De Haan and Rogally, 2002). Family strategies can involve sending young adults to the city, and investing in a potentially remitting child (Lucas and Stark, 1985). Both low and high skilled individuals are more likely to migrate but usually for different reasons: "surplus" low-skilled individuals have strong incentives to move to the city in search of a manual job they may not find in the rural area, while "scarce" educated workers may find that their human capital is better rewarded in cities than in rural areas (Lanzona, 1998, Agesa, 2001). In most countries, internal migration concerns young men because urban job markets usually offer a large share of occupations available to rural male migrants, or because men bear lower risks of vulnerability than women when migrating. Latin America, in which the migration of female domestic workers has become predominant, stands out as an exception.

The decision to migrate also involves contextual factors, such as 'push factors' which force migrants out of rural areas and 'pull factors' which attract migrants to urban areas.

These factors typically reflect the relative strength of the local economies (such as the availability and remuneration of jobs), the existence of local amenities, the cost and availability of public goods, or even institutional factors. For instance, the introduction or enforcement of a system of land property rights might act as a push factor and encourage migration from rural areas for workers that are displaced, as well as for the new land owners, since owners can leave their properties without the fear of losing their assets and can even sell them or use them as collaterals to finance migration. The absence of a rural credit market may also act as a push factor when migration of a family member is used to generate remittances in order to overcome credit constraints and finance rural productive investments (see Katz and Stark, 1986a). Of course, the migration decision also depends on its monetary and non-monetary costs. Distance to potential destinations has been shown to deter migration (Schwartz, 1973, Greenwood, Ladman and Siegel, 1981). A few studies suggest that migration is facilitated by the concentration of the migrant pool (of same origin) in the area of destination (Mora and Taylor, 2005).

Other recent studies shed light on the assimilation of migrants to the urban labor-market. Indeed, the first concern of migrants when arriving in a city is often to secure a job, which can prove difficult as migrants are likely to have only imperfect information about the type or quality of job opportunities they face (Banerjee, 1984a). In order to find a job, they often resort to informal channels such as friends and networks (Banerjee and Bucci, 1995). Finding a job is facilitated when the same-origin network at destination is larger but this does not preclude the existence of a congestion effect if migrants compete with one another for jobs (Yamauchi and Tanabe, 2003). In a dynamic perspective, it has also been found that education enhances migrants' learning from their experience in the labor market of destination and thus accelerates the convergence of migrants' earnings towards natives' earnings (Yamauchi, 2004). Of course, the difficulties faced by migrants of rural origin are numerous. In particular, they might be discriminated against (Assaad, 1997, Meng and Zhang, 2001) and can have difficulties gaining access to credit and local public goods.

Once settled in a city, migrants often remit to their families in the rural area of origin. An abundant literature on this issue shows that the motives can be diverse (see Rapoport and Docquier, 2005). Remitting might serve to take care of the migrants assets and relatives back home (Cox, Eser and Jimenez, 1998), to invest in one's parents to secure potential bequests (De la Brière, Sadoulet, Janvry and Lambert, 2002), to insure one's family against volatile incomes (Gubert, 2002), or to repay a loan (Ilahi and Jafarey, 1999). Remitting can also be justified by sheer altruism or social norms (Azam and Gubert, 2002). Interestingly, remittances sent to rural areas might benefit different populations depending on the context, which implies that remittances do not systematically benefit the poor or the rich.[2] The diversity of contexts also explains that remittances serve a variety of uses. They can be used for consumption (Banerjee, 1984b), for housing investments when anticipating the event of return migration (Osili, 2004), as well as capital expenditure (Lucas and Stark, 1985).

It should be clear from the summary above that the literature has provided many descriptive insights into the phenomenon of urban migration. However, in spite of five decades of abundant research, some key policy questions have not found clear answers yet:

(i) To what extent is internal migration a desirable phenomenon and under what circumstances?

(ii) Should governments intervene and if so with what types of interventions?

(iii) For the latter, what should be the policy objectives?

Answering these questions is not easy given that internal migration may have both positive and negative implications. On the one hand, internal migration is a prerequisite for urbanization, a phenomenon whose role has long been recognized as the key correlate accompanying economic growth, at least in the case of European cities in the 19th and early 20th centuries. In developing countries, internal migration can also be a source of

[2] One reason for this could be that different countries stand at different phases of their urban transition, a phenomenon during which landlord families migrate before peasant families. Knowles and Anker (1981) suggest that remittances benefit more the rich than the poor in Kenya, a country which was then at the beginning of the urbanization process, while De Haan (2002) argues that in India, a country well into the urbanization process, remittances may form a more important part of poor households' income than that of the better-off.

remittances to rural areas, contributing to rural development -- both directly if used in education and productive investments, and indirectly via higher consumption levels. But, on the other hand, internal migration from rural to urban areas can exert a lot of pressure on cities who may not have the capacity to absorb large population flows and to provide migrants with an adequate level of public goods. This can lead to slum formation and in extreme cases to internal crime and unrest. Urbanization may also lead to an unbalanced distribution of the population and contribute to increasing disparities between rural and urban areas. In view of these potentially opposite effects, it is not surprising that governments have implemented conflicting policies ranging from policies to restrict rural to urban migration to policies to accommodate, or even stimulate migration flows. The current view among experts increasingly tends to support the last two types of policies (see Skeldon, 2003a and 2003b, or Waddington, 2003). But how many of these recommendations are based on economic analysis and justification?

The objective of the present work is to shed some light on internal migration policies in developing countries in the light of economic theory. To do this, not only is it important to understand migration patterns but the related welfare issues also need to be analyzed and the consequences of internal migration to be properly assessed. Are the existing models relevant and have they been properly evaluated by empirical tests? What are the policy implications of these models? To what extent do empirical findings shed light on policy issues? We try to answer these questions in two steps. The next section reviews the existing theoretical models and their policy implications. Section 3 presents relevant empirical studies and discusses the extent to which policies could find justifications in their results. We also discuss the methodology of these models and empirical studies and try to identify areas that need further research. The last section concludes.

2 THEORETICAL MODELS AND POLICY IMPLICATIONS

For the purpose of our discussion, we classify the different theoretical frameworks in which internal migration has been modeled into three types: the first type covers the dual economy models which emerged in the 1950s and 1960s, the second type covers the Harris-Todaro models developed in the 1970s and 1980s, and the third type covers the more elaborate microeconomic models on which much of the research has focused over the past 15 years (including some important contributions to the so-called New Economics of Labor Migration).[3] We will survey these families of models and their policy implications sequentially.

2.1 The beneficial role of migration in early dual economy models

The first theoretical work involving rural to urban migration is the Lewis (1954) model of development which tries to explain the transition from a stagnating economy based on a traditional rural sector to a growing economy driven by the development of a modern urban sector. In this model, economic growth does not only stem from the accumulation of capital in modern industry but also from the *interaction* between the rural and the urban sectors. Lewis assumes that rural economies initially present a specific context in which there is 'surplus labor' in the agricultural sector, so that marginal productivity in that sector is close to zero. Workers in the rural sector are assumed to share the output among themselves so that they are remunerated at their mean product.[4] Given these assumptions, the agricultural sector is able to supply a perfectly elastic labor force to the modern industrial sector which can grow by accumulating capital and poaching labor from the traditional agricultural sector, paying wages just equal to the mean product in the agricultural sector. The transfer of the labor force between the two economic sectors involves the reallocation of the labor force across space through migration from low population density rural to high population density urban areas. Migration occurs until surplus labor or 'disguised unemployment' is absorbed by the modern sector. Ranis and

[3] For a presentation of the New Economics of Migration and its research program, see Stark (1991). For a mostly empirical survey on internal migration in developing countries, see Lucas (1997).
[4] The reason for this payment arrangement is to avoid having workers paid a wage equal to zero as would imply marginal productivity remuneration under surplus labor.

Fei (1961) introduce the possibility of technical progress in the agricultural sector and assume that the agricultural sector can also absorb capital investments. In that extension, the duration of the take-off process increases with the rate of demographic growth and decreases with the intensity of the investment effort in both economic sectors.

Both the Lewis and Ranis and Fei formalizations describe in a very stylized manner a general mechanism occurring at an initial stage of economic development, which justifies the assumed scarcity of capital and the abundance of labor in these models. The assumption of zero marginal productivity and remuneration at the average product in the agricultural sector is more debatable and has been criticized even though it probably should not be taken at face value: what really matters in the model is that the rural sector can massively provide migrants to the urban sector. In this simple framework, internal migration is desirable to the extent that it accompanies growth.

The policy implication of this model is that governments in countries experiencing a transition from a labor-intensive agricultural economy to an economy with significant industrial and services sectors should see to it that migration from rural to urban areas is at least not impeded, and ideally is even facilitated.

This type of model also suggests that government should ensure that investments are intense enough for the take-off to ever occur. This would tend to argue in favor of policies favoring investments in modern labor-intensive industries in order to exhaust rural disguised unemployment. It is important, nevertheless, to keep in mind that the Lewis framework applies only to a particular phase of the development process and sheds little light on other contexts. It appears to inadequately describe the urbanization process of many Sub-Saharan African countries, even at the beginning of their urban transition.[5] In particular, the observation in the late 1960s that *urban areas experienced high levels of unemployment* suggested that these models might not tell the right story about rural urban interactions.

[5] For evidence of urbanization without growth in Africa, see Fay and Opal, 2000.

2.2 The harmful role of migration in Todarian models

The Todaro (1969) and Harris-Todaro (1970) models also consider the role of internal migration in a dual economy in which the urban sector draws labor force from the rural sector. But the change of focus is radical. In the Lewis model, internal migration removed 'disguised unemployment' from rural areas and enabled the transition to a modern economy. In Todarian models, the focus is on explaining the existence of unemployment in urban areas and its link with internal migration.

2.2.1) The basic setting

Todaro's intuition and the Todaro paradox

Todaro (1969) proposes a simple dynamic formalization in which individual migration decisions are based on the difference between the discounted expected income streams in urban and rural areas net of migration costs. In this model, an urban job-seeker evaluates his discounted expected income stream in the city taking into account the endogenous probability of being employed. While labor demand in the city exogenously increases at a constant rate over time, labor supply increases with migration at an endogenous rate which is assumed to be a function of the difference in discounted expected income streams between the urban and the rural area. In steady state, migration flows ensure that the urban labor force grows at exactly the same rate as labor demand, determining a constant *equilibrium unemployment rate* in the city. The main contribution of Todaro's framework is thus to link urban unemployment and migration flows. Under certain parameter values, the intensity of the link can lead to a paradox (known as the Todaro paradox): a policy aiming at increasing the number of available jobs in a city may very well increase the level of unemployment because of *induced* migration. This can easily be seen by writing a simplified version of the model.[6] If we denote by λ the exogenous rate of urban job creation, L_M the level of urban employment, and $L\text{-}L_R$ the total labor force supplied to the city, the number of job creation is λL_M , and the number of unemployed

[6] This is partly borrowed from Todaro 2000, Appendix 8.1. Our notations follow those of Basu (1997).

workers is $L\text{-}L_R\text{-}L_M$. Considering that the probability of obtaining a job in the urban sector over a given period is given by the ratio of jobs created to the number of job seekers (i.e. assuming that all jobs turn over in each period and random job selection), the probability of finding a job for an unemployed worker is thus $\lambda L_M / (L\text{-}L_R\text{-}L_M)$. Denoting w and r the urban wage and the rural income respectively, the expected urban-rural income differential δ is then:

$$\delta = w\lambda L_M / (L\text{-}L_R\text{-}L_M) - r \qquad (2.1)$$

Assuming that migration responds to the income differential δ implies that $L\text{-}L_R$ should be considered a function of δ. From (2.1), any policy affecting the rate of job creation λ will thus have an impact on the expected income differential δ and, in turn, on the urban labor supply $L\text{-}L_R$. The Todaro paradox will occur if the increase in labor supply $d(L\text{-}L_R)/d\lambda=(d(L\text{-}L_R)/d\delta).(d\delta/d\lambda)$ is greater than the increase in labor demand $d(\lambda L_M)/d\lambda=L_M$. Using (2.1), the condition for an increase in the unemployment level is as follows:

$$(d(L\text{-}L_R)/(L\text{-}L_R)) / (d\delta/\delta) \; > \; (\delta/w)\,((L\text{-}L_R\text{-}L_M)/(L\text{-}L_R)) \qquad (2.2)$$

The interpretation is as follows: if the elasticity of urban labor supply with respect to the income differential between urban and rural areas (the LHS in 2.2) is greater than the income differential –written as a percentage of the urban wage– multiplied by the unemployment rate in the urban area (the RHS in 2.2), an increase in job creation will trigger an increase in the number of unemployed workers. Todaro argues that this formalizes what happened in Kenya in 1964 when the Kenyan government and private employers agreed to immediately increase employment levels by 15 percent but only managed to increase overall unemployment by attracting new workers to cities. However, empirically testing the values of these parameters is somewhat tricky.

The standard Harris-Todaro model

Harris and Todaro (1970) presented a static framework version of the Todaro model in which the interaction between the rural and urban sectors is more detailed. Using the same notations as before, let us consider an economy with L workers among which, in equilibrium, L_R will remain in the rural area and will be employed in the rural agricultural or traditional sector, and L-L_R will reside in the urban area. There is no unemployment in the rural sector and perfect competition in that sector ensures that the rural labor is remunerated according to its endogenous marginal productivity $f'_R(L_R)$.[7] In the urban manufacturing or modern sector, labor is remunerated at a fixed and exogenous minimum wage w, which means that the stock of urban jobs L_M is fixed and satisfies $f'_M(L_M)=w$. The supply of labor in the urban sector L-L_R incorporates migrants to the city, but only L_M workers will be employed in the urban sector. This implies that the employment rate is equal to $L_M/(L-L_R)$. As in the Todaro model, the excess of job seekers over available urban jobs imposes the existence of a rationing mechanism: assuming random job selection, the probability that an urban resident is employed is given by the proportion of the urban labor force which is actually employed $L_M/(L-L_R)$. The expected income in the urban sector is given by the minimum wage multiplied by this proportion. Contrary to what happens in the dynamic Todaro model, *migration is now only a disequilibrium phenomenon*. It occurs in the *transition* to the equilibrium to ensure that the urban unemployment rate equates expected incomes in the urban and the rural sectors. This corresponds to the following equilibrium condition:

$$f'_R(L_R) = wL_M / (L-L_R) \qquad (2.3)$$

Interestingly, the Harris-Todaro formalization implies that the Todaro paradox is more likely to occur when the labor-demand elasticity in the urban sector is large. To see this, assume for simplification that flows out of the rural sector do not change much the rural

[7] Contrary to Lewis' assumption of zero marginal productivity, this implies that outmigration from the rural area now decreases the production in the traditional sector.

wage so that $f'_R(L_R)$ can be treated as constant in our calculations.[8] Let us consider a policy of job creation in the urban sector (implying a reduction in the fixed wage w since $f'_M(L_M)=w$ must continue to hold). Let us denote by $\varepsilon < 0$ the labor-demand elasticity in the urban sector $(dL_M/L_M) / (dw/w)$. Using (2.3), calculations yield:

$$d(L-L_R) / dL_M = (1+1/\varepsilon) (w/f'_R(L_R)) \qquad (2.4)$$

It is easy to see from the above equation that job creation (an increase in L_M and the associated decrease in w) will induce rural-urban migration (an increase in $L-L_R$) whenever the RHS of (2.4) is positive, which occurs if $\varepsilon < -1$. Furthermore, migration to the city will exceed the number of jobs created if the urban labor-demand elasticity is sufficiently large in absolute terms, i.e. if $\varepsilon < -w/(w-f'_R(L_R))$. The result is intuitive by looking at (2.3): the increased labor demand initially reduces the size of the urban unemployment pool and increases the probability of formal sector employment in the city $L_M/(L-L_R)$. This in turn attracts migrants and decreases the labor supply L_R in the rural sector until expected wages are equalized across regions and (2.3) is satisfied again. In other words, with a large elasticity of labor demand in the urban sector (in absolute terms), a fixed objective of job creation will only require a small decrease in the fixed wage but a significant amount of migration to the city in order to equalize expected wages across regions again. When the elasticity is sufficiently large, the large inflow exceeds the number of jobs created and the level of unemployment increases.[9]

2.2.2) Policy recommendations arising from the Harris-Todaro models

Apart from its apparent consistency with stylized facts (reconciling internal migration and urban unemployment), another important feature of the Harris-Todaro model is to lend itself to a simple welfare analysis showing that the market equilibrium is suboptimal,

[8] This assumption is also adopted by Stark, Gupta and Levhari (1991) to study the model's comparative statics in a similar fashion.

[9] Observe that in the Harris-Todaro framework, the *urban unemployment rate must always decline* following a policy of job expansion, *even if the number of unemployed workers increases*. This can be seen by writing the derivative of the employment rate with respect to the number of available urban jobs. This yields $d(L_M/(L-L_R)) / dL_M = -(f'_R(L_R)/w^2) (dw/dL_M)$, which is always positive.

thereby providing directions for government interventions. The suboptimality stems from the institutionally determined urban minimum wage. With this market imperfection, the allocation of labor is not efficient from a productive point of view because *marginal products are not equalized across sectors* (see Bhagwati and Srinivasan, 1974, Basu, 1980). *It is instead expected incomes that are equalized* in the equilibrium migration condition (2.3). The optimal allocation would naturally be attained in the laissez-faire competitive equilibrium in the absence of the urban wage rigidity and no unemployment.

This suboptimality justifies policy recommendations of two kinds in order to improve welfare: acting on migration and/or wages. Understanding that there is 'excess migration', the question is how to best attenuate the urban unemployment problem without encouraging migration from rural to urban areas.

Disincentives to and restrictions on migration

Given the model's predictions, one policy is to restrict migration flows. If migration in excess of the labor required to produce the urban output is prohibited, then aggregate welfare is always increased because this policy increases rural output without diminishing the production of the urban good.[10] Many countries have followed this path (see our discussion on policies in the empirical section).

Wage subsidies

Since the inefficiency in the Harris-Todaro model comes from a wage rigidity, another policy emerging from the analysis is to reform wages. In the Harris-Todaro perspective, reforms that make urban wages less rigid should bring the allocation of labor in the economy closer to the optimum. Alternately, taking the wage rigidity as given, policy reforms arising from welfare analysis focus on wage subsidies. Harris and Todaro (1970)

[10] However, this policy may be detrimental to rural dwellers: the permanent urban labor force always gains from migration restrictions (due to full employment at the fixed minimum wage and the availability of the agricultural good at a low price) but when the demand for the agricultural good is not sufficiently elastic, the terms of trade according to which rural dwellers can exchange the rural good for the urban good deteriorates.

considered the case of a wage subsidy to the urban sector alone, showing that it *cannot* restore the social optimum and causes suboptimal employment in the rural sector because of induced migration. With this instrument, the best that can be done is to ensure that urban jobs are created until the marginal productivity in the urban sector equates the marginal amount of rural output sacrificed because of migration (i.e. the marginal productivity in the rural sector multiplied by the number of migrants induced by the creation of a single additional urban job). Combining an urban wage subsidy and migration restrictions can move the economy to a greater aggregate welfare by simultaneously increasing the urban output through wage subsidies and preventing the exacerbation of unemployment through migration restrictions. However, as Harris and Todaro (1970) pointed out, this policy will require a substantial compensation to the rural sector to ensure a Pareto-improvement in utilities.

Bhagwati and Srinivasan (1974) argued that policies should not be restricted to urban-wage subsidies and migration restrictions as proposed by Harris and Todaro. In fact, policies need not necessarily restrict migration to implement the first best optimum in the Harris-Todaro model. In particular, there exists a uniform wage subsidy given to *both* rural and urban sectors, which yields the optimal first best solution by reducing urban unemployment while preventing rural outmigration. Basu (1980) later completed Bhagwati and Srinivasan's analysis by showing that any subsidy above the optimal uniform wage subsidy will also yield the social optimum. To a certain extent, this result solves the information problem of finding the right subsidy since any sufficiently large subsidy will do the job (but at a higher cost)[11]. To our knowledge, such policies have not been implemented, in part because, they would be very costly.

Policy effects on inequality

Given the established link between urbanization and inequality in developing countries (which mirrors Kuznets' famous hypothesis that inequality first increases and then

[11] Strikingly, all these papers consider the case of exogenously financed policies. For papers that investigate the implications of financing policies in Todarian models, see Heady (1987 and 1988) and McCool (1982).

decreases with development, see Anand and Kanbur, 1985, Gupta, 1988, Chakravarty and Dutta, 1990, and Rauch, 1993), it is also important to understand the potential effects of policies on inequality in a Todarian framework.[12] In this respect, the most transparent work is probably that of Fields (2005) who gauges the effects on inequality of three main policy options ('rural job creation', 'urban job creation', and 'urban wage limitation') in a standard Harris-Todaro model by looking at their effects on Lorenz curves, intersectoral wage differentials, and on a class of social welfare functions combining measures of both earnings and inequality. The most robust analytic result is that the creation of rural jobs has beneficial effects on all the dimensions considered. This is different from job creation in the urban sector which increases the number of high wage jobs on the one hand, but increases unemployment and earnings inequality on the other hand. Finally, the effect of an urban wage limitation is ambiguous: it mechanically reduces labor incomes and can raise inequality if the demand for labor is sufficiently elastic. These ambiguous results show the fragility of inequality analyses in such models. As Fields puts it, '*how* distributional concerns are brought into the policy analysis can and does make an important difference'. This brings us to a broader critique of the policy implications of the standard Harris Todaro model.

2.2.3) Critiques of the standard Harris-Todaro model and its policy implications

The Todaro Paradox conveyed the message that internal migration can be harmful because it exacerbates urban unemployment. Given the high unemployment rates and significant migration to cities in developing countries, this idea has certainly inspired many governments to implement restrictive policies even though the empirical validity of the Harris-Todaro model and of the Todaro paradox are not clearly established. In any case, the Harris-Todaro model suffers from theoretical oversimplifications, among which several are likely to overestimate the link between migration and urban unemployment. The critiques revolve around six major points:

[12] In the Harris-Todaro model, since (2.3) ensures that migrants and non-migrants have the same expected or ex-ante utility, analyses of inequality focus on *ex-post* utility, which is the utility governments should naturally feel concerned about.

(1) The Harris-Todaro framework is only a static model describing migration, which is a dynamic phenomenon by nature. Even though the model can be thought of as representing a steady state equilibrium, this is a limitation. Furthermore, the formalization is made in a partial equilibrium context which greatly weakens the justifications for policy recommendations.

(2) Important aspects are absent from the standard Harris-Todaro model, including the probable heterogeneity of migrants which is not accounted for, risk aversion which could dampen migration incentives and render the Todaro paradox even less likely to occur, the possibility of job search in the urban area from the rural area, the possibility of return migration, or the existence of rural unemployment. In fact, the Harris-Todaro is almost silent about what happens in the rural areas.

(3) The assumption that urban workers are either employed in the manufacturing sector or unemployed has been criticized as too simplistic even though, in the authors' minds, it was implicit that unemployment could also be interpreted as underemployment in the informal sector. Cole and Sanders (1985) have criticized the Harris-Todaro model for not explicitly modeling the subsistence sector employing uneducated migrants, arguing that it flawed the job selection process and expected income calculations if, by lack of qualification, uneducated migrants could not find a job in the modern urban sector.

(4) The job rationing mechanism or hiring model hypothesized is not realistic. In particular, assuming random job selection in each period overestimates the likelihood of finding a job. Stiglitz (1974) suggests that the employment probability might vary in a non-monotonic way with the duration of the stay in the city: it could increase in the first periods when migrants form social networks in the city, and then decrease in the later periods because of deteriorating human capital or because of bad signaling.

(5) The Harris-Todaro model assumes that the urban wage is exogenously set above the endogenous rural wage since it must be that $w > f'_R(L_R)$ for (2.3) to hold. The assumption that wages are high find several explanations ranging from the existence of trade unions to the agglomeration of economic activities.[13] It is confirmed in practice,

[13] Economic Geography has shown that agglomeration in the manufacturing sector in a context of increasing returns to production and imperfect competition produces high real wages (the large local

since wages are often reported three to four times higher in urban areas than in rural areas (Todaro, 2000). What is more problematic, however, is the assumption that the urban wage is fixed, especially in the presence of an informal sector as typical of many developing economies. In fact, the argument of a minimum wage should only hold for low wages in the formal sector, unless remunerations in the informal sector align themselves with those in the formal sector (due to the competition for labor between employers).[14] In addition, the wage in the Harris-Todaro model is not related to unemployment in any manner. If the urban wage tends to decrease with an increase in the unemployment rate as argued by Hoddinott (1996) in his study on urban African labor markets, then this would tend to reduce the expected earnings differential in the transition towards the equilibrium in the model. This gives another reason why migration flows could be overestimated, making the Todaro paradox even less likely to occur.

(6) The assumption of migration led by expected income differentials may overlook other important elements in the migration decision. In particular, it has been observed that migration can occur even when the urban expected income is below the rural income, which is clearly inconsistent with the income differential approach adopted by the Harris-Todaro model (see Katz and Stark 1986a).

In view of these critiques, the policy implications derived from the Harris-Todaro model -- i.e. to restrict the rural to urban migration -- are much weaker. In particular, there are several reasons that qualify the justifications of restrictive migration policies. First, Todarian models only focus on urban labor markets whereas national governments should be concerned with whether overall national employment (i.e. including rural areas) has improved. Second, as observed by Stark (1991), in a general equilibrium perspective, the migration of labor between rural and urban areas may reflect a disequilibrium in another market, for instance poorly-functioning capital markets in rural areas, which can induce migration and should therefore be addressed. Third, it cannot be

market leads to high nominal wages and the diversity of goods to a low price index, see Fujita, Krugman and Venables, 2001).

[14] Evidence on whether labor markets in developing countries are segmented is mixed. Whereas Heckman and Hotz (1986, on Panama) or Pradhan and van Soest (1995, on Bolivia) find that the return on individual characteristics differs across the formal and the informal sectors, Magnac (1991, on Colombia), Maloney (1999, on Mexico) or Pratap and Quintin (2005, on Argentina) do not reject the competitive assumption hypothesis.

ruled out that migration may have a positive impact on rural areas, possibly by raising productivity, allowing exchanges with urban areas, and generating income for rural development. Fourth, restrictions to rural-urban migration could prove very harmful. We have seen that in the perspective of the Lewis model, migration controls are limitations of the labor market which may prevent developing countries from launching labor-intensive industries which could, in turn, alleviate poverty. Last but not least, mobility is a basic human right, and depriving people of that right is difficult to justify. The only economic justification for restricting migration flows would be that migrants do not internalize the possibly negative externalities they exert. In any case, this judgment would not require an eradication of migration but a regulation of the phenomenon to bring it to a socially desirable level.

2.2.4) Extensions of the Harris-Todaro model and their policy implications

To address the problems encountered with the Harris-Todaro formalization, several extensions have been proposed. How important are these changes? How do they affect policy justifications?

Given that the Lewis model focused on surplus labor in rural areas and the Todarian models focused on urban unemployment, one natural extension of the Harris-Todaro model is to include a different specification for the rural sector. For instance, Khandker and Rashid (1994) consider a dual economy model inspired from Bhatia (1979) in which there is surplus labor in agriculture so that workers are paid their average product. There are now two pools of redundant labor: unemployed workers in the urban area and agricultural surplus labor. In this context, the authors obtain that a manufacturing wage subsidy may reduce surplus labor while increasing open unemployment.

Other extensions have tried to model a more realistic labor market. In this respect, Fields (1975) makes several modifications which all tend to reduce the unemployment rate predicted by the model. In particular, when allowing for urban job search from the rural area, workers have less incentives to migrate. Similarly, the introduction of a transitional

informal sector makes it possible for migrants to work while searching for a modern sector job. The effect of introducing worker heterogeneity is more elaborate. If better-educated workers are always hired, preferential hiring reduces the number of jobs available to uneducated workers and thus reduces the migration incentives for uneducated rural workers.

The third set of extensions have endogenized the urban wage by resorting to a Nash-bargaining between urban firms and a trade union (Calvo, 1978) or in an efficiency-wage setting to reduce labor turnover (Stiglitz, 1974), or to deter shirking (Moene, 1988). Without delving into a technical discussion, it is sufficient to mention that in contrast to the standard Harris-Todaro model, endogenizing urban wages makes wage subsidies inappropriate. In the Stiglitz model, a wage subsidy in the urban sector is partially shifted and always increases the unemployment rate. In the Calvo model, a wage subsidy has little impact on the urban-rural wage differential and thus tends to be less efficient than in the standard Harris-Todaro framework. Contrary to Bhagwati and Srinivasan (1974)'s finding that migration restrictions are not needed, migration barriers now become necessary to attain a first-best optimum.

A fourth set of extensions looks at the interplay between migration and the urban land-market in a Harris-Todaro perspective. Brueckner and Zenou (1999) add an urban land market to a standard static Harris-Todaro framework and model the urban area as a monocentric city with an endogenous population. Following an exogenous shock such as a modern sector enlargement or an increase in the urban wage, the unemployment rate and thus the probability of being employed is not the only force that restores the equilibrium: land prices also respond to changes and help close the gap between rural utility and the expected utility of urban residents. In this model, formal-sector growth does not necessarily induce migration: enlarging the formal sector causes land rents to rise, which may depress a potential migrant's expected utility in spite of his better chances of finding a job. When this is the case, the overall urban population, and thus the informal sector, must shrink to restore the migration equilibrium.

All these extensions show that modifying the Harris-Todaro framework alters the working of the model and its policy implications.[15] For instance, Fields' results suggest that any policy affecting the search efficiency of workers has implication on their employment but also on their migration behavior. The Khandker and Rashid model stresses that governments should be concerned with the overall employment effects of internal migration (which the standard Harris-Todaro model does not allow) and not with urban employment only. But the modeling of the labor market seems difficult to refine further. Because of their twist towards an analysis of urban unemployment, Todarian models miss several important issues related to migration. Not surprisingly, the models which have appeared since the 1980s depart from that setting and present internal migration in a much different light.

2.3 The potentially beneficial role of migration in recent models

Recent models of internal migration adopt a complete change in perspective as they do not pretend to explain urban unemployment as in the Harris-Todaro framework. Their contributions belong to three categories that provide a better explanation of migration selectivity, a finer analysis of job-search, or that focus on the role of migration on rural development.

2.3.1) More elaborate explanations of migration selectivity -- who chooses to migrate

The most investigated issue in the literature is clearly the 'Who migrates' question, which can be more complex than it seems. The New Economics of Migration has provided subtle analyses on this issue, stressing the role of information asymmetries, incomplete insurance and credit markets, or relative deprivation.

[15] Other extensions have used the Harris-Todaro framework to study trade and growth-related issues. Capital mobility has been introduced in a Harris-Todaro framework in order to study the complex interplay between migration and capital imbalances (see Corden and Findlay, 1975, Khan, 1980, Beladi and Naqvi, 1988) or how migration responded to tariffs protecting an import-competing manufacturing sector (see Beladi and Marjit, 1996). Growth models also integrated Todarian frameworks. In this respect, Bencivenga and Smith (1995) modeled the link between the fluctuations of capital/labor ratio in urban manufacturing and rural-urban migration and were able to explain cycling migration flows as well as long periods of sustained growth interrupted by a sudden recession.

Migration takes place in a world of imperfect information that can account for the sorting of migrants according to their skills. A series of models initially focusing on selectivity in international migration apply in principle to internal migration as well. In these works, the key assumption is that information about skills does not flow freely across labor markets. If we assume with Katz and Stark (1984) that employers in a home region (which we will interpret as the rural area of origin) have better information on workers' productivity than employers in a host region (which we will interpret as an urban area), skilled workers may not find it beneficial to migrate. This is because skilled workers would be paid a lower wage in the host region (equal to their group's average productivity) than in their home region where their skills are recognized. However, when skilled-migrants can signal themselves to employers in the host region by incurring a moderate fixed cost, they will now find it beneficial to migrate (Katz and Stark,1986b). Assuming that wage patterns are not linear in skills, this framework can generate the migration of high and low-skilled groups with middle-skill groups not migrating (Katz and Stark, 1987).

Other works have focused on alternative motivations to migrate which can contradict the view that the expected income differentials between urban and rural areas necessarily has to be positive in order to induce migration.[16] The paradox can be explained when migration entails a small chance of reaping a very high reward. For instance, when utility is assumed to increase with comparative wealth or with the ranking of the individual in the income distribution of his group of reference, a very risk averse worker facing only a small expected increase in his wealth if he migrates, can still choose to migrate to the city if the *possible* wealth increase greatly increases his social status among rural residents and migrants (Stark, 1984, Katz and Stark, 1986a).[17] This model predicts that rural individuals whose income position is in an upward-sloping portion of the income density function will be more likely to migrate since they can expect to greatly increase their social status even with only a small chance of a monetary gain.

[16] Katz and Stark (1986a) report empirical findings that cast doubt on the expected positive income differential assumption (see Banerjee and Kanbur, 1981, on India, or Garrison, 1982, on Mexico).
[17] The same individual facing the same conditions would not migrate if utility only depended on income.

2.3.2) The job-search approach -- when and how to migrate

Rural to urban migration is job-related in its nature so it is natural to study migration in a detailed job-search framework which allows to model migration and job-search as joint decisions. Migration models with job-search can account for a variety of patterns including the differences in unemployment duration among migrants, the choice of repeat or return migration, the diversity of search choices, or the selection of migrants to particular destination areas.

With a view to explain unemployment duration among migrants, Harris and Sabot (1982) describe a job-search mechanism in which migrants are confronted with a distribution of job offers with different wages. Ignoring the exact distribution, migrants decide whether to accept a job offer upon a subjective distribution they have in mind. Workers with pessimistic expectations have lower reservation wages and do not stay unemployed very long.

Vishwanath (1991) models a continuous lifetime program of search and migration assuming that rural individuals have three options involving different information flows and search costs: (i) stay in the rural area forever, (ii) engage in rural-based search for an urban job, or (iii) move to the city and engage in urban-based search. Once employed in the city, workers can then choose to engage in on-the-job search or not. This framework provides yet another explanation of the income differential paradox since migration can be rational even if the mean urban wage is below the rural income. This is because, when viewed in the context of a continuous program of job search, the dispersion in the distribution of job offers (for a given mean wage) increases the value from urban-based search and migration.

Repeat and return migration can be obtained in models with job-search and incomplete information such as in Bhattacharya (1990) where workers have to move to a particular location in order to be able to observe the quality of jobs offered at that location. In a life cycle perspective, Dustmann (1997) models return migration by assuming that a worker

can migrate with the intention of raising his total consumption possibilities but planning to come back for home consumption after an optimal period of time spent in the destination area.

The direction and the intensity of population movements is accounted for in a job-search perspective by Carrington, Detragiache and Vishwanath (1996) who consider a dynamic migration model in which migrants already settled in the destination area exert a positive externality on potential migrants such that the moving costs between regions decrease with the pool of previous migrants.[18] In steady state, the endogenous cost of migration is simply equal to the present discounted value of the wage differential between any two locations. Because of the *externality* in the migration cost, migration occurs gradually over time with individuals whose moving costs are low migrating first. Interestingly, there is no simple relation between migration and regional wage differences as in the standard migration theory. In particular, migration can accelerate while income differentials narrow if the externality becomes sufficiently strong. Because the positive externality is not internalized by agents, there is *too little migration* compared to the optimum, and it may even be that a socially efficient migration never starts. Based on this model, there is thus room for public interventions to help workers migrate, for instance by subsidizing migration or by improving information flows to villages. Furthermore, policies directed towards helping early migrants are Pareto-improving whereas poorer area development may halt out-migration and widen long-term interregional income differences.

The idea that migration is good and therefore should be encouraged is even more clearly defended in general equilibrium settings such as Ortega (2000) who proposes a search-matching model with two separate labor-markets which differ structurally: one region (which we shall interpret as the urban area) offers a better environment than the other one to the extent that it has a lower exogenous job separation rate. Unemployed workers can

[18] There are several justifications for this assumption: (i) Migrants often send job and housing market information back home; (ii) They often help later migrants to find a job, accommodation, or to set up a business; (iii) For new migrants, the presence of previous migrants lower the cost of adapting to an alien environment, culture, or language.

either search for a job in their region of origin or in the other region but incurring a migration cost. This framework yields multiple equilibria and the author shows that the migration equilibrium –from the disadvantaged to the advantaged region– Pareto-dominates the no-migration equilibrium. This is because the better structural characteristics of the host region allow migrants to benefit from better employment prospects while natives also benefit from the labor demand boost following migration. In the wake of Ortega's paper, Sato (2004) proposes a search model with rural-urban migration that incorporates frictional urban unemployment and an endogenous urban wage determined by Nash-bargaining. Under certain conditions (when the bargaining power of workers is low), the model's equilibrium is one of urban labor scarcity in which the urban sector has too many firms and too few workers. A policy which enhances rural to urban migration will then increase welfare.

Policy implications -- Governments have a role to encourage migration in a job search framework, because they can increase the efficiency of job matches in the internal migration process, since migrants can make suboptimal choices due to imperfect information. This rationale underpins policies (i) in developed countries, such as the Job Search and Relocation Assistance program implemented by the U.S. Department of Labor which offers information on out-of-area jobs, job-search grant funds and relocation grants (see Mueller, 1981), and (ii) in developing countries, such as China's regional programs to match urban jobs and rural migrants (as in the Qimba mountain project).

2.3.3) Migration's positive effect on rural development

Probably the most important contribution of the New Migration Economics is to provide new insights into the potentially positive link between internal migration and rural development, stressing the role of remittances sent to the rural area.

Stark and Levhari (1982) who focus on migration as a family strategy, present migration of a family member as a way to diversify the risks associated with family earnings in the absence of a rural insurance market and/or when income diversification opportunities in

rural areas are scarce. The analysis is carried further by Stark and Lucas (1988) who consider that migration of a family member can result from a cooperative arrangement struck between the migrant and his family. Both parties are risk averse but incur different risks at different times, which makes co-insurance mutually advantageous. The migrant is insured by his family while looking for a job. Later on, the family can engage in the adoption of a new agricultural technology knowing that the migrant will be able to compensate adverse shocks.

Internal migration might also enable the financing of productive investments in rural areas to circumvent credit market imperfections. This can also explain the paradox of migration in spite of an expected negative income differential (Katz and Stark, 1986a): if the return on investment in the rural area increases with the level of the investment (for instance with the adoption of modern techniques), then it might be rational for a rural resident to migrate to an urban area even if it involves a lower expected wage income. This is because even a small chance of getting some additional income in the city will enable a very profitable investment in the rural area. Interestingly, this predicts that migration flows could originate from regions with a high production potential but with capital market imperfections whereas the Harris-Todaro model would only predict migration from regions with a low production potential.

Policy implications -- The implications of these models is that policies should ensure that the role played by migration on rural development is optimized. This covers a multitude of potential interventions and programs, such as helping migrants send remittances home, helping rural recipients allocate remittances for rural development by directing them towards more productive investments, and even interventions that enable migrants to keep social links with their areas of origin[19], not just to transfer remittances but also to transfer other resources such as information.

[19] In China it has been suggested that a way of maintaining such links would be to allow migrants to retain certain rural residency and land rights in addition to those they may have in their area of destination (Ping and Pieke, 2003).

An interesting implication of these models is that policies could also target those among poor families who do not have migrant members given that these families have less opportunities to escape poverty. For instance, micro-finance programs in rural areas could target non-migrant households who do not receive remittances to offset credit constraints, or who may not have access to the networks that provide services to wealthier migrant households.

3 EMPIRICAL MODELS AND POLICY IMPLICATIONS

The previous section has shown that the diversity of theoretical formalizations does not deliver a single message on internal migration, even though the most recent contributions provide a rather positive message on the role of internal migration. Unfortunately, the empirical literature does not provide structural tests of these models but only partial findings that can support or invalidate intuitions and, in that sense only, support or invalidate the policy implications of the models.

We now turn to another strand of the literature -- that based on empirical / econometrically estimated relationships to see if they strengthened the foundations of different policy interventions. This live picture relies on the income differential approach to explain migration choices. But specifications are more *ad hoc*, lacking equilibriating mechanisms found in the theoretical formulations. The organizational structure of this section first addresses motivations and then consequences of the migration process.

3.1 The decision to migrate

An abundant empirical literature has tried to identify the determinants of the migration decision given that migration responds to spatial differences in utilities, mainly due to spatial differences in incomes net of migration costs. In the 1960s and 1970s, many works tried to explain the flows of internal migration using aggregate data. The approach consisted in estimating 'modified gravity models' of migration inspired by Newton's law of gravitation which depicted migrating flows as directly related to the size of populations at the origin and the destination, and inversely related to distance. These

modified gravity models also considered the effects of the push and pull factors in both areas of origin and destination. Today, this approach -- which can only broadly describe population movements -- has been replaced by finer micro-econometric methods.[20]

The simple approach: the binary model

The typical migration equation at the micro level specifies a binary variable (moving *versus* staying) as function of a set of regressors. This approach focuses on the decision to migrate of individuals originally located in a given area. In this perspective, migration choice can usually be modeled either with a linear probability, a probit or a logit model. In binary-choice models, migrating is a dummy ($Y_i = \mathbf{1}(Y_i^* > 0)$) where Y_i^* is a latent variable specified as a function of a set of explanatory individual characteristics X_i and an unobserved effect ε_i such that:

$$Y_i^* = X_i.\alpha + \varepsilon_i \qquad (3.1)$$

This should be considered as a reduced-form approach implying that one should be cautious about interpreting the coefficients in the absence of a structural model. For instance, consider a case where age is included in (3.1) as an explanatory variable in the vector X_i. If age simultaneously has an effect on outcome differences (for instance if younger people gain more in wages from migrating) as well as on moving costs (for instance if younger people incur lower moving costs), then one may not be able to tell whether individuals in different age groups exhibit different migration behaviors because they are confronted with different opportunities or because their migration costs differ. This identification problem calls for a more relevant specification of opportunity differences. Several studies in the past, have tried to include the difference in regional-aggregate variables in (3.1) such as the unemployment rate differential $A_{r(i)}$ between the region of origin r of an individual i and all other potential regions of destination as follows:

[20] More details on gravity models can be found in Greenwood (1997).

$$Y_i^* = X_i.\alpha + A_{r(i)}.\beta + \varepsilon_i \qquad (3.2)$$

However, this specification is not satisfying: the proxy for opportunity differences would be the same for all individuals originally residing in the same region, even if they do not have the same individual characteristics. Hence, part of the identification problem remains. One way to deal with this could be to compute conditional aggregate variables (for instance the unemployment rate of women interacted with a gender dummy) or to directly interact individual characteristics with regional-aggregate differences: one could then investigate for instance whether educated individuals are more responsive to differences in cultural amenities. But the assumption that all individuals originating from the same region face the same opportunity differences $A_{r(i)}$ upon migration remains, which is not a desirable feature. For instance, including the regional differences in average wages in (3.2) is not desirable because individuals may face job opportunities yielding individual-specific wages.

A structural improvement

The literature has found other ways to solve the identification problem, by specifying simultaneously a wage equation for moving (3.3'), a wage equation for staying (3.3''), and a migration equation (2.3) as a function of wage differences ($w_{m,i}$ - $w_{s,i}$) and other individual characteristics X_i. Now, the difference in wages is individual-specific and is believed to capture regional differences in *individual opportunities*, while individual variables can account for moving cost heterogeneity. The system of equations can be written as follows:

$$Y_i^* = X_i.\alpha + \gamma.(w_{m,i} - w_{s,i}) + \varepsilon_i \qquad (3.3)$$

$$w_{m,i} = Z_{m,i}.\delta + \varepsilon_{m,i} \qquad (3.3')$$

$$w_{s,i} = Z_{s,i}.\eta + \varepsilon_{s,i} \qquad (3.3'')$$

It is important to note that, eventhough the wage associated with migration is observed only for movers and the home wage is observed only for stayers, the wage $w_{m,i}$ (resp. $w_{s,i}$) must reflect the *potential wage* associated with migrating (resp. with staying) for the *whole sample* and not just for movers (resp. stayers). If the migration-wage equation were only estimated on the subsample of movers, the estimated coefficients would probably be biased because of selection issues. There are two methods to overcome this problem. The first method, is to apply the two-stage Heckman method as originally done by Nakosteen and Zimmer (1980) and Robinson and Tomes (1982) for developed countries. Surprisingly this method has only recently been applied to analysis in developing countries in papers such as Lanzona (1998) on the Philippines, Agesa (2001) on Kenya, or Tunali (2000) on Turkey. The second method is to estimate the equations simultaneously by maximum likelihood.[21] This structural improvement is not only a matter of econometric rigor, failure to adjust income gains for selectivity can lead to a severe bias: Islam and Choudhury (1990) find that not correcting for selectivity underestimates the internal migration impacts of income gains in Canada.

Accounting for multiple destinations

One shortcoming of the above specifications is that they group all potential destinations in a single 'rest of the world' destination. Of course, this is often due to the lack of available and measurable data, and because multivariate analyses are often less tractable. However, this is really problematic since individuals face a set of different potential migration destinations with different local opportunities. It is intuitive that workers may not only decide whether to migrate but also decide where to migrate; they may even make these choices simultaneously. Some papers address this issue by considering

[21] Three remarks are in order. First, for the model to be identified, exclusion restrictions are needed for the variable sets X_i and Z_i. In other words, one needs variables in Z_i that are not in X_i and variables in X_i that are not in Z_i. Variables in Z_i only allow for variation in the wage difference holding fixed individual characteristics in the migration decision. This allows to identify γ (for more details on exclusion restrictions and relevant estimation strategies, see Gobillon and Leblanc, 2003). Second, our discussion has focused on wages, whereas a more correct approach could be to consider expected incomes (which would also require modelling the individual's expected probability of finding a job). Third, the selection of working *versus* non-working among migrants should also be corrected for (see Tunali, 2000, or Agesa, 2001).

polychotomous choice models, usually multinomial logits. The general specification of such models can be written as follows:

$$r(i) = \text{Argmax}\,(V_{i,r}) \qquad (3.4)$$

$$V_{i,r} = X_i.\alpha_r + \beta.w_{i,r} + \mu_{i,r} \qquad (3.4')$$

$$w_{i,r} = Z_{i,r}.\gamma_r + \nu_{i,r} \qquad (3.4'')$$

where $V_{i,r}$ is the indirect utility of individual i if locating in region r, and $r(i)$ is the chosen location. In this model, the individual compares utilities across locations and rationally chooses the location yielding the highest utility level. The utility at a given place is a function of the individual and location-specific wage, as well as of moving costs which depend on individual variables (through X_i in (3.4')). In this setting, migration is triggered by regional differences in the return on observed characteristics ($Z_{i,r}$ in (3.4'') for characteristics valued by the labor market, or X_i in (3.4') for other characteristicss) or unobserved characteristics (affecting $\mu_{i,r}$ or $\nu_{i,r}$). For instance, if one considers how wages can affect migration, regions might have different returns on education (as in Dahl, 2002) or different returns on unobserved characteristics. Migration can also be triggered by idiosyncratic shocks, affecting $\nu_{i,r}$ in (3.4'') such as good job opportunities that yield a wage bonus.

This type of model is used by Falaris (1987) who estimates a nested logit of individual internal migration across 23 states in Venezuela grouped in 7 regions. Distance between states is used as a proxy for moving costs. The model is estimated in three stages: The author first estimates the probability P_j of choosing a state j by decomposing that probability into the probability of choosing state j conditionally on being in region k and the probability P_k of choosing region k, both probabilities having a logit specification. He is then able to estimate state-specific equations on the subsample of in-migrants, correcting for sample selection bias, using Lee (1983)'s method. Finally, the wage equations are used to impute a potential real wage for each person in each state. He is then able to estimate the structural version of the nested logit model (of the form (3.4)

and (3.4')) using these imputed wages. In accordance with the theory, he finds that wage differentials do indeed affect migration decisions in Venezuela.[22]

These improved approaches still have the drawback that they assume that individuals have all the information necessary to compute the different utility levels associated with the different migration choices.[23] They also raise a variety of econometric issues, most of them linked to the imperfection of available data (see the Appendix for more details).

3.2 The consequences of migration

A second strand of the internal migration empirical literature in developing countries focuses on the consequences of migration. Do migrants gain from migrating? Is migration beneficial for rural areas, for urban areas, or even for the economy as a whole?

3.2.1) Consequences of migration for the individual

To check whether migrants really improve their situation by migrating, the empirical literature has mainly tried to estimate the monetary returns to migration focusing on wage comparisons (current earnings being considered as a proxy for the stream of future income) or on the dynamics of migrants' wages.

[22] One reason to use a nested logit instead of a standard multinomial logit is to attenuate the problems caused by the property of 'independence of irrelevant alternatives' (*iia* hereafter) as necessarily assumed in this type of models. Indeed, with Falaris' approach, one needs to assume *iia* across regions and across states within given regions, but not across states in different regions, which is less constraining but not completely realistic. Focusing on internal migration in the United States, Dahl (2002) uses a more general approach which completely gets rid of the *iia* problem. Dahl proposes a novel methodological approach also relying on the estimation of a wage equation for a subsample of migrants and correcting for selection bias. However, the location choice process does not need to be specified: the probability of migrating from one state to another state is estimated non-parametrically using the frequency estimator for individuals sharing the same characteristics, namely education and age. This comes down to assuming that individuals with the same characteristics are affected in the same way by the determinants of migration. The main advantage of the method is that it allows one to estimate individual migration decisions even in the presence of numerous potential destinations.

[23] This may not always be true, especially in developing countries, and could reduce the explanatory power of these estimations. It might thus be worth thinking about alternative specifications that would take into account the imperfect information of potential migrants.

Estimating the gains from migration

Several approaches can be used to measure the change in remuneration associated with migration. With cross section data, it is possible to build counterfactuals and compare the earnings of migrants with the earnings they would have had, had they not moved. This can be done by computing a wage when staying and when moving, using equations (3.3') and (3.3'') and correcting for selection bias. The difference between the two potential wages can be said to account for the effect of migration on wages.

Observe that with panel data, it is also possible to directly estimate whether migrants gain from migration by taking advantage of the panel dimension. One approach is simply to regress the change in earnings between two dates as a function of personal characteristics (or changes in personal characteristics) and migrant status:[24]

$$\Delta w_i = X_i.\alpha + \beta.M_i + \varepsilon_i \qquad (3.5)$$

As mentioned in the previous section, studies usually measure a gain associated with migration but it does not have to be the case given the possibility of an income differential paradox which has workers migrate in spite of a lower wage in the area of destination (Vishwanath, 1991, Katz and Stark, 1986a). One important reason can be that workers incur a short term loss in their income but a long term gain. This justifies studies that focus on the assimilation of migrants in a dynamic perspective when longitudinal data are available.

Estimating the extent and speed of labor-market assimilation in the place of destination

[24] The advantage of differencing a cross-section model (variables in the RHS of (3.5) are then expressed as differences) is that it can wipe out fixed effects potentially correlated with the error term in the cross-section regression of wages, thus removing a potential endogeneity problem of nonlongitudinal data, and justifying differenced estimations without having to control for selection. However, an endogenity problem may remain even after differencing if there is some selection on individual residuals.

To investigate the dynamics of migrants' wages, the study of reference is Borjas, Bronars and Trejo (1992) who focus on interstate movements in the United States. After constructing a migrant dummy for individuals who changed states during the period considered, the authors regress the logarithm of workers' wages as follows:

$$\ln w_i = X_i.\beta + \gamma_1.E_i + \gamma_2.E_i^2 + \delta_0.M_i + \delta_1.M_i.T + \delta_2.M_i.T^2 + \varepsilon_i \qquad (3.6)$$

where w_i is the wage, X_i is a vector of personal characteristics, M_i is a dummy variable for migrants, E_i is the duration of labor market experience, T_i is years since migration and ε_i is a random error term. In a regression such as (3.6), one should expect to find $\delta_0 < 0$, measuring the initial disadvantage of migrants (since migrants can only partially transfer their region or firm-specific knowledge when migrating), and $\delta_1 > 0$, capturing the pace at which migrants catch-up with non-migrants. $\delta_2 < 0$ expresses a slowing-down in the convergence.[25] The authors explicitly do not include any job characteristics in (3.6) because they argue that the process of assimilation precisely involves job mobility: they want to compare the earnings of migrants and non-migrants for the same type of jobs, but to account for the better job matches of migrants over time.[26] As hypothesized, Borjas *et al.* show that internal migrants initially earn less than natives but experience a higher growth rate so that the wage differential disappears after a few years. The initial disadvantage of migrants increases with the distance migrated, reflecting an increasing mismatch in job-specific experience.

Other studies that try to open up the black box of post-migration labor-market assimilation and to identify the key factors of success are scarce. Friedberg (2000) replicates Borjas *et al.*'s methodology to study the assimilation of migrants to Israel. She shows that human capital acquired abroad is only partially transferable, and that more educated migrants have a faster assimilation rate, which suggests that immigrants could

[25] As otherwise standard in wage equations, one should also expect to observe $\gamma_1>0$ and $\gamma_2<0$ reflecting a positive but concave effect of experience on wages. The vector β measures how the market values personal characteristics.

[26] In a situation where it is believed that the catching-up process occurs through pay raises, it would be necessary to control for job characteristics. In developing countries, given the mixed evidence on labor-market segmentation, it is not clear what pattern of labor-market assimilation prevails.

benefit from further training *following* immigration. Yamauchi (2004) investigates the differences in labor-market assimilation between educated and non-educated internal migrants to Bangkok. Interacting education with destination experience (defined as the time spent in Bangkok) yields a positive coefficient, suggesting that educated migrants are able to raise their wages by accumulating effective experience at the place of destination faster than uneducated migrants.[27]

Measuring the effect of social interactions and social networks in facilitating migration and assimilation

A series of papers look at whether social networks play a key role in migration and labor-market assimilation. To study how the labor outcomes of migrants are affected by their social networks, a simple and straightforward approach is simply to introduce variables in (3.6) such as the percentage of migrants of same rural origin residing at the place of destination. However, the existing works adopt a different approach.

In their study of migration to Bangkok, Yamauchi and Tanabe (2003) run a probit model on the employment probability of new migrants (defined as those who have stayed in Bangkok less than one year) taking into account individual and household characteristics as well as network factors that are specific to the province of origin: the employment probability estimated among the group of migrants from a particular area, and the relative share of migrants from a particular area in the whole migrant population residing in Bangkok. With this method, one needs to distinguish the effect of group-specific externalities (the network effect) from correlations between the labor-market outcomes of recent and previous migrant groups. Indeed, there could be common unobserved characteristics specific to the province of origin or shocks correlated among same-origin migrants. This problem is addressed by pooling cross-sections over time and including origin-specific fixed effects and origin-specific year shocks. The results show that whereas the job-search efficiency of previous migrants increases the probability of

[27] Following these works, mirroring the role of general and specific experience, it would be interesting to study the difference in the assimilation rate among migrants depending on whether they acquired their education before or after migrating.

employment of new migrants, the relative size of the migrant population in the local labor-market decreases it. They interpret the latter result as a congestion effect among migrants competing for jobs.

A criticism of this kind of work is that the potential endogeneity of the social network is seldom controlled for. One exception is Munshi (2003) who studies the role of social networks in the migration of Mexicans to the United States, using a panel dataset of individual location decisions and labor outcomes from multiple communities. In this work, the number of other migrants from the same origin-community is instrumented with rainfall in the origin-community since rainfall is a push factor that naturally affects rain-fed agriculture employment.[28] With this endogeneity control, it is found that an individual is more likely to be employed and to hold a higher paying job when his network is larger.

Policy implications -- These works suggest that education or social networks can help migrants in their gradual process of labor-market assimilation in the city even though *the specific channels through which networks and education operate are not identified*. These channels probably include different kinds of support or opportunities that migrants may lack. In this respect, policies that could help migrants overcome assimilation barriers are diverse. Measures can aim at improving the bargaining power of migrants on the labor-market, for instance through sharing information and collective negotiation (Mosse *et al.*, 2002). Governments can see to it that migrants, and especially poor migrants, are not credit rationed so that entrepreneurship is not discouraged, that migrants are not discriminated against in the housing market, and that they find a satisfactory access to public goods, including child care, health and education.[29] Supporting the political involvement of migrants in local politics can help migrants ensure that their needs are taken into account by local policy makers. Several other measures can ensure the protection of rural migrants in cities, providing them with information on labor legislation and rights, favoring their unionization, and ensuring that they hold written

[28] This instrument may nevertheless be less relevant when agriculture is irrigated in rural areas.
[29] In China for instance, rural migrants still face strong obstacles to access healthcare services (Shaokang, Zhenwei and Blas, 2002) or to educate their children (*China Daily*, 2003).

contracts. Welfare funds can provide insurance to the most vulnerable migrants. Other measures can guarantee to preserve the rights of migrants in the rural area of origin while away.

3.2.2) Consequences of migration for the rural area of origin

Besides the effect of migration on the migrants themselves, empirical work has also investigated how migration affects the families of migrants and the rural areas of origin. In theory, rural to urban migration can potentially affect rural areas in two ways: by removing the migrant's labor, income and expenditures from his original location (the direct effect of migration), and by generating transfers between the migrant and his family (the effect of remittances). The latter effect can be measured at the individual level for stayers receiving remittances, as well as at the community level if the focus is on inequality or poverty. Not surprisingly, whether the departure of migrants to the city improves or not the livelihood of those who stay in the rural areas is theoretically ambiguous. On the one hand, internal migration to the city may relieve a strained labor market in which labor supply is plethoric and may provide rural inhabitants with remittances from their relatives who left for the city. On the other hand, rural to urban migrations may have a negative impact on rural areas by removing workers from productive rural activities or through externalities of various types, for instance through the deterioration of family or community structures, by leaving individuals, especially women, in declining rural area with little development prospects. Identifying the net effect is however an empirical exercise.

Consequences for families with migrants

Families with migrants may be affected by migration through several channels. The simplest approach to measure the effect of migration on families with a migrant is to regress an outcome of interest Y_i (for instance poverty or child health) on a set of explanatory individual characteristics X_i, on a dummy variable equal to 1 if a household has a migrant member and 0 if not, and on an error term ε_i as follows:

$$Y_i = X_i.\alpha + \beta.M_i + \varepsilon_i \qquad (3.7)$$

Since an endogeneity problem is likely to arise in (3.7) in the presence of an omitted variable correlated both with migration and with the outcome of interest, OLS estimations could be biased. To circumvent this problem, one can resort to instrumental variables to predict migration.[30]

However, (3.7) is a very reduced form which does not shed much light on the mechanisms at work. Many studies prefer to explicitly consider the role of remittances which play a key role in the theories of the New Economics of Migration.[31] It would therefore be tempting to replace the migrant dummy M_i with the size of the remittances received by the family R_i in (3.7), yielding:

$$Y_i = X_i.\alpha + \beta.R_i + \varepsilon_i \qquad (3.8)$$

But given possible endogeneity problems (the possibility of omitted variables as in (3.7) as well as of reverse causation since an adverse outcome Y_i may attract remittances), OLS estimates are likely to be biased. Unfortunately, the literature does not seem to have come up yet with a valid instrument for remittances.[32] It is thus necessary to resort to other estimation strategies to more satisfactorily measure the effect of remittances. One example is by Yang and Martinez (2005) who make use of a unique natural experiment to study the impact of international remittances: the depreciation of the Philippine peso during the 1997 Asian crisis which caused an exogenous variation in the size of

[30] For instance, following Woodruff and Zenteno (2001), McKenzie (2005) uses historic migration rates to predict current migration.

[31] Remittances are certainly not the only channel through which having a migrant might alter a family's outcome. But it may be the main channel since money transfers can greatly increase the level of household expenditures. In Guatemala for instance, it is estimated that households that receive internal remittances increase their expenditures by 37.1 percent on average. In comparison, the households that receive international remittances increase their expenditures by 39.5 percent, which is of about the same magnitude (Adams, 2005).

[32] More details on this problem can be found in McKenzie (2005).

remittances received from abroad. Unfortunately, we do not know of a similar natural experiment used to study the effect of remittances arising from internal migration.

Consequences for income distribution at the place of origin

Several studies investigate whether remittances increase or decrease inequality in rural areas. Stark, Taylor and Yitzhaki (1986) compare two Mexican villages: one which has had much internal out-migration, and another one which has been subject to more international out-migration to Southern California. Using household data, the authors are able to simulate the effect of small changes in the different types of income (non-remittance income, remittances from internal migrants, and remittances from international migrants) and to provide a fine analysis of household inequality in each village. Obviously, the impact of marginal changes in remittances upon inequality depends upon where the recipients of remittances are located within the village income distribution, on the share of remittances in village incomes, and on the distribution of remittances themselves. The authors find that in the village where many households have links with internal migrants, remittances from internal migrants have an equalizing impact on the village income distribution, whereas remittances from international migrants have an unequalizing impact. Stark, Taylor and Yitzhaki (1988) show the robustness of these findings using extended Gini decompositions. Other studies on Pakistan (Adams, 1994) and the Philippines (Rodriguez, 1998) also find that internal migration is more likely to decrease inequality, in contrast to international migration. The postulated explanation is the selectivity of migrants among the two types of migration. Furthermore, it has also been argued that the effect could also depend on the phase of migration when considered over time. Studying international migration from Mexico to the United States, McKenzie (2005) finds that when the pool of migrants is small, the upper-middle range of the wealth distribution benefit more from migration and remittances. When the pool has grown bigger, it gradually benefits poorer individuals. As already mentioned, the same is likely to apply to internal migration in developing countries since landlord families usually migrate before peasant families during the

urbanization process. This is consistent with the idea that inequality in the region of origin has an inverse U-shaped relationship with migration.

From an econometric point of view, the study of changes in inequality due to migration and remittances can be tricky. An important issue is whether the labor-market participation of the rural families receiving remittances is considered to be endogenous or not (i.e. whether money transfers are a potential substitute for home earnings or not). If this is the case, what should be investigated is how the observed income distribution at the place of origin compares to a counterfactual scenario without migration and remittances. Barham and Boucher (1998) study this issue using cross-section data from a survey of households in a Nicaraguan town with a long history of migration. To build the counterfactual scenario, the authors impute the earnings migrants would have had if they had remained in town, and what other family members' decisions would be as regards labor participation. They then use the results to impute participation decisions and earnings for migrants and non-migrants in migrant households. While simply comparing income inequality measured by a Gini index with and without remittances would indicate that remittances from internal migration reduce inequality, the comparison to the counterfactual scenario shows that, in fact, internal migration increases inequality -- a result qualitatively similar to that of international migration.

Consequences for production at the place of origin

Another issue is how migration can affect production at the place of origin. In the case of rural surplus labor as postulated in the Lewis model, migration should have no effect on production other than through remittances spent on productive investments or because of increased demand on rural goods. If labor is not in surplus, labor transfers have to be accounted for since the two effects play in opposite directions.

Lucas (1987) uses time series data over a long period to study inter-regional migration in Southern Africa (international migration to South Africa's mines from neighboring countries). The econometric model incorporates both the determinants of international

migration to South African mines and the economic consequences for neighboring labor-supplying countries. For each economy, equations are estimated for migration to the mines, domestic crop production, cattle accumulation, and estate labor. It is found that, in the sending economies, domestic crop production (i.e. production in rural areas) is negatively affected by the withdrawal of labor (in the *short run*), but positively affected by investments remitted by migrants (in the *long run*).

This conclusion is confirmed by the work of Rozelle, Taylor and DeBrauw (1999) on a sample of farm households in the northeast of China in the Hebei and Liaoning provinces. They find that migration involves labor lost *initially* which depresses yields, but that access to capital through migration-induced remittances increases yields *eventually*. The short run versus long-run distinction is important for analyzing the impact of migration on production in the place of origin.

Consequences for human capital and growth at the place of origin

Migration can have a negative effect on the local stock of human capital by removing individuals with particular skills, or it can have a positive affect by stimulating investment in the acquisition of human capital by potential migrants (Stark and Wang, 2002). These two effects can act in opposite directions so that the overall effect is a matter of empirical investigation. The idea of a 'beneficial brain drain' in which migration prospects induce investment in human capital has been studied in the case of international migration by Beine, Docquier and Rapoport (2001) using aggregate cross-section data for a set of developing countries. In order to control for the endogeneity of migration, the authors simultaneously estimate country-specific migration rates, investments in human capital and the growth rate of the national economy, using the ex-post migration rate as a proxy for the ex-ante probability to migrate. The results indicate that migration prospects play an important role in education decisions, but given the use of aggregate cross-section data the results should be considered only suggestive at this stage.

In the case of internal migration, Kochar (2004) provides a test using microeconomic data. The method consists of estimating how the differences in returns to schooling between a rural area and the nearby urban area affects the probability of completing middle school for rural boys aged 15-20. The results show that rural schooling decisions in India are undertaken in response to the possibility of employment in urban areas.

3.2.3) Consequences of migration for the urban area of destination

To our knowledge, work on the effects of internal migration on the urban area of destination is scarce. This contrasts with the more numerous studies of the impact of international migration on natives in the host country of destination (for surveys, see Borjas, 1999, or Greenwood and McDowell, 1999). But the effects of internal migration could differ from those of international migration. In the case of internal migration, the absence of an exchange rate makes migration a central equilibriating mechanism for regional imbalances in economic activity so that partial equilibrium analysis seems inappropriate. Furthermore, because of differences in migrant selectivity (which should probably be attributed to differences in migration costs and migration restrictions) and because of differences in local economic contexts (the more regulated labor market in developed countries *versus* the less regulated urban labor markets in developing countries), the expected effects on the area of destination and their magnitudes should also differ. In particular, internal migrants in developing countries are more likely to be less skilled than natives in the urban area of destination, whereas international migrants might be more or less skilled than the average native in the country of destination. To better characterize internal migration flows and stocks, it would be very useful to build databases on internal migration by education in a selection of developing countries, complementing the work of Docquier and Marfouk (2005) who recently built such a database for international migration. But, to our knowledge, this work remains to be done.

The effect of migration on local wages in the place of destination

The first papers which were concerned with the areas of destination tried to assess or, given the difficulty of the task, at least discuss whether the Todaro paradox was verified (see Todaro 1976, Garcia-Ferrer, 1980, Saltvatore, 1981, Lucas, 1985). But few works have investigated the effect of internal migration on wages in the urban areas of destination (one exception is Wrage, 1981, for Canada).

In the Todaro perspective, a migration-induced increase in labor supply could depress wages. Intuitively, this effect can be studied at the aggregate level by regressing urban wages on migration inflows from rural areas but migration flows should be considered endogenous because they respond to differences in regional wage opportunities. To correctly estimate this impact, it is necessary to instrument migration flows, for instance by using climatic variables at the rural region of origin as noted earlier. Another problem is that the labor composition in the urban area changes with migration. This could bias the interpretation of the pressure of migration on urban wages attributed to a labor-supply increase relative to labor demand. This problem could partly be overcome by segmenting migration inflows by migrants' labor-market observed characteristics. However, differences in unobserved characteristics between migrants and natives could still remain. In the Lewis perspective or in a New Economic Geography perspective, the story could be completely different. Internal migration in developing countries could accompany agglomeration and growth in urban areas. The increase in productivity due to increasing returns to scale could involve a raise in wages. We do not know of empirical work which has tested these issues but this could be a useful direction for future research.

The effect of migration on competition for jobs at the place of destination

Another important and politically sensitive issue is that of the competition for jobs between migrants and locals. Do migrants take jobs that would otherwise be held by locals? Or, on the contrary, are they self-employed or employed in isolated labor-market segments, thus having no direct employment effects on locals? The literature provides

only mixed evidence. In the case of China for instance, Knight, Song and Huaibin (1999) find that migrants of rural origin hold jobs that non-migrants shun. On the other hand, Roberts (2001) mentions the issue of local workers in Shanghai being laid-off by state enterprises and competing with migrant laborers in the formal sector.

The effect of migration on poverty at the place of destination

Finally, the effect of internal migration on urban areas is not limited to an impact on wages and employment. In a country such as South Africa, migration from poor rural areas is often viewed as contributing to a strengthening of residential segregation, an increase in the number of poor, and a costly burden on local public services. These issues have seldom been studied empirically, probably due to the lack of adequate micro-data.[33] One exception is Mohtadi (1986) who uses cross sectional data of cities and rural regions from Iranian censuses in order to assess how migration from rural areas affects urban inequality. Not surprisingly, the finding is that inequality in urban areas tends to increase with migration when migrants are from a poorer, landless group, and to decrease when they are from a better off, landed group.[34]

Policy implications -- The considerations above suggest that the inflow of migrants to cities can be problematic if not accommodated properly. Accommodationist policies cover programs designed to assist migrants upon their arrival in urban areas in order to reduce the economic and social costs of migration and to maximize its gains. The idea is to provide rural migrants with an environment that 'allows them to make use of their energy and skills' (Skeldon, 1997). Measures can be as diverse as the creation of reception centers for migrants, helping them access essential public goods, or helping them acquire affordable housing (such as the programs launched by the South African

[33] There is a real need to measure the characteristics of migrants with respect to age, gender, education, health, family structure, ethnicity and poverty at a *local* level. Generating and using localized census data and the construction of neighborhood poverty maps at a metropolitan scale could be a prerequisite for useful research in the Future.

[34] This study uses cross sectional data and, therefore, only focuses on short term effects.

government to build cheap and affordable houses for rural migrants who have been living in shacks at the periphery of cities for years).[35]

3.2.4) Consequences of migration for the economy as a whole

Some empirical studies have been more ambitious and have tried to measure the national changes in production, income and inequality resulting from internal migration. The issue at stake is whether migration allows workers to move to areas where they are more productive and if efficiency gains occur at the cost of rising inequality. From an applied point of view, only structural models of internal migration or calibrated computable general equilibrium models can pretend to shed some light on this complex issue.

Several works have integrated internal migration in their assessment of trade barriers reduction. Taylor, Yunez-Naude and Dyer (1999) investigate the impacts of NAFTA on rural employment and wages and rural out-migration in Mexico following a reduction in the government support price of corn. This is done using a village-town model which blends microeconomic household farm models with economywide modeling.[36] The model is estimated on survey data from households located in towns and surrounding villages in the Michoacan province. The authors find only a small impact of trade liberalization. Zhai and Wang (2002) simulate the effects of a reduction in trade barriers on rural-urban migration and urban unemployment in China. Their simulations show that there is a great need to co-ordinate trade, labor and internal migration policies. In the context of trade liberalization measures (a gradual reduction of import tariffs), if rural-urban migration controls are relaxed (increasing labor mobility) without a labor-market

[35] It should be noted, however, that *accommodationist* policies conceal an important ambiguity. In South Africa, there is a tension between preventing 'land invasions' (informal settlements appearing on vacant land within the city) and helping informal settlers ameliorate their housing conditions. Pakistan facing a problem of squatter settlements, was confronted with a similar tension between legalizing such settlements and evicting them. A recent Peruvian program aiming at entitling urban squatters with property rights made sure that only current squatters could be included in the program and that demands from new squatters would be turned down in the future (see Field, 2003). It is doubtful whether such announcements can be made to be completely credible.

[36] For computable general equilibrium techniques used to explore the impacts of policy changes on village economies and migration, see Taylor and Adelman (1996).

reform (imposing a fully flexible urban wage), then urban unemployment will rise dramatically. The authors reach the conclusion that if the relaxation of migration controls is accompanied by a full labor-market reform, then China will maximize its gain from trade liberalization.

Works that use these models to study the effect of mobility restrictions are scarce. Au and Henderson (2006) show that migration restrictions have generated insufficient agglomeration in China's urban areas, resulting in GDP losses. Whalley and Zang (2004) investigate the extent to which mobility restrictions in China (the Hukou system) possibly contribute to overall income inequality. They propose a simple model in which the removal of mobility restrictions reallocates labor across regions so as to equate marginal productivities (flexible wages). When migration restrictions are removed, all wage differences and most income inequality disappears. Extensions which take into account labor efficiency differences across regions or in which urban house price rises retard rural-urban migration lead to a smaller reduction in inequality. Hu (2004) simulates a spatial agglomeration model to explain the increasing regional disparity between coastal areas in China and their hinterland.

4. CONCLUSION

This survey has reviewed theoretical and empirical models of internal migration in developing countries. On the big question -- should rural to urban migration be discouraged, tolerated, or encouraged -- the broad assessment is that restrictions in general are not desirable.

In principle, the Todarian models can be used for policy analysis in situations where urban unemployment arising from rapid rural to urban migration is a concern. However, the empirical literature has not been convincing in assessing whether the conditions for the Todaro paradox were met in the real world.[37] Empirically testing the Harris-Todaro model has also been complex so that these tests are no more convincing than the tests for

[37] For discussions, see Todaro, 1976, Garcia-Ferrer, 1980, Salvatore, 1981, and Lucas, 1985.

the conditions for the Todaro paradox to hold.[38] At best empirical tests have provided microeconomic evidence consistent with the migration incentives present in the Harris-Todaro model, measuring for instance how rural dwellers respond to an increase in the wage differential (see Section 3). But *this type of evidence does not provide a real test of the link between urban unemployment and migration*. In other words, the validity of the model has not been clearly established even though it certainly influenced policies for decades.

Many countries have implemented policies aimed at forbidding migration from rural to urban areas. In South Africa, the Apartheid system (1948-1994) used extreme controls to monitor what was meant to be the temporary migration of rural workers to cities. In Indonesia, the 'transmigration program', a policy of resettlement from high to low-density areas has been implemented over several decades, resulting in the relocation of more than eight million people between 1969 and 1995 (Humanitarian Policy and Conflict Research, 2002). Similarly, in China, the *Hukou* or household registration system initiated in 1955 required that all residents live in the places where they were born and obtain permissions to move (see Cheng and Selden, 1994, for more details). Until the 1970s, migrants were even transferred back to their village in order to prevent 'over-urbanization'. Some of these programs did meet their objectives of restricting rural to urban migration, but very few have been subjected to a rigorous analysis of their welfare costs. Au and Henderson (2006)'s empirical finding suggest that migration restrictions in China have maintained surplus labor in rural areas and led to insufficient agglomeration of economic activity in cities, resulting in GDP losses.

Other policies aimed at providing people with incentives not to migrate have been less extreme. In India and Malaysia, nativist policies favored persons locally born (Waddington, 2003). Attempts have also been made to ensure that urban development

[38] The literature provides mixed and controversial evidence. For instance, Barnum and Sabot (1977) believed that the Todaro paradox did occur in Tanzania. But Collier (1979) later argued that Barnum and Sabot's test was limited to the extent that it treated urban unemployment as an exogenous explanatory variable. Basing his own study on a general equilibrium model for Tanzania, Collier suggested that the informal sector expanded because of a rise in primary education which increased the number of workers eligible for unskilled wage employment but not because of formal employment expansion as a Todaro explanation would have implied.

did not appear too attractive for potential rural migrants. For this reason, the Mexican government discouraged certain types of investment in the largest metropolitan areas (Cole and Sanders, 1983). Thailand, India or Peru also introduced policies to discourage migration to big cities (Waddington, 2003).

Rural development schemes have also been used as an indirect way of deterring migration to cities. While rural development schemes appear to have been relatively successful in Latin America (since non-agricultural rural employment is steadily growing, Schejtman, 1999), they have not universally met their objectives. For instance, Malaysia's rural development policies which did help the rural poor, did not stem urbanization (Skeldon, 1997). Since the late 1970s, China has pursued a strategy of rural industrialization, which has reduced intraprovincial migration but has had no effect on interprovincial migration, suggesting that rural enterprises may have absorbed only potential migrants who would have migrated *within* rather than *between* provinces (Liang, Chen and Gu, 2002).

By contrast to the Todarian models, the rural surplus labor models -- supporting rural to urban migration -- seem to be better founded. What really matters in the Lewis, Ranis and Fei models is not whether there is disguised unemployment in rural areas, but whether the rural sector can massively supply migrants to the urban sector to accompany rapid national growth. Evidence so far confirms that this is indeed the case in China (see Henderson, 2005).[39] The policy implication is that rural to urban migration should not be impeded.

As a result, policies in developing countries are increasingly more concerned with influencing the direction of rural to urban migration flows – e.g. to particular areas -- with the implicit understanding that migration will occur anyway and thus should be accommodated at as low a cost as possible. The idea is often to prevent massive inflows to large overcrowded cities while helping migrants of rural origin to find a job in smaller

[39] This is consistent with Knight, Song and Huaibin (1999)'s remark that, in China, most of the increase in urban demand for labor in the years to come will have to be met from the rural areas.

or medium-sized cities. This is usually advocated through the decentralization of infrastructure and activities with a view to create new centers of growth that will be able to absorb the rural population influx. Bangladesh for instance is trying to reduce the congestion of city centers by promoting industries and services in periurban areas and secondary cities (Skeldon, 2003b). With the benefit of hindsight, industrial and urban decentralization strategies have been fairly successful in Korea and Cuba, but faced significant challenges in India, Malaysia and Tanzania (Waddington, 2003).[40]

To our knowledge, whether or not rural to urban migration in developing countries should be diverted from large cities to secondary and tertiary cities as a policy objective has not been analyzed yet in an adapted theoretical framework. Similarly, whether the diverse array of programs that have been or will be implemented are successful and at what cost remains to be evaluated. They could prove difficult to implement because of the dispersal of the population in rural areas and because of weak institutions. If such programs are to be generalized, should potential migrants be trained before or after migrating? [41] What is the best way to facilitate information sharing in rural areas? How can potential migrants better choose where to migrate given their qualifications and the distribution of job opportunities in urban areas? Should recruitment agencies, analogous to those that are often already active in the context of international migration, help rural dwellers secure a job contract before migrating to the city? What types of specific savings and credit programs could help workers finance migration costs?

In short, the survey has shown that the class of Todarian models -- although very influential in the migration literature -- presents weaknesses that attenuate their validity for the analysis of internal migration and the design of policies. More realistic models that have emerged in the last two decades provide detailed insights into very specific issues and directions for policy recommendations. In particular, recent job-search models in which migration can improve job matches or models in which migration is presented

[40] Because large development proved more effective than small-scale industries, such projects are more likely to succeed when they are accompanied by the necessary local infrastructure (Waddington, 2003).
[41] In the case of China, Zhao (2003) suggests that villages should be helped to initiate out-migration, which can afterwards turn into a self-sustaining process.

as a way to circumvent rural constraints, such as credit-market and insurance imperfections, support the view that internal migration in developing countries should not be completely checked. Furthermore, there is some empirical evidence that internal migration contributes to the development of rural areas through remittances by enabling the financing of productive investment and by reducing poverty even though its effects on inequality are mixed. In most studies, remittances are spent on both consumption and investment, enabling both short-term increases in the standard of living and long-term development in rural areas. In urban areas, internal migration does not necessarily cause massive unemployment as suggested by Todarian models, and studies on the labor-market assimilation of migrants indicate that migrants can catch-up with natives under certain circumstances. These elements support the view that migration can be beneficial or at least can be turned into a beneficial phenomenon. This change in focus has strong implications for migration policies, suggesting that the general goal of these policies should probably be restated as *trying to best accommodate migration flows while preventing the widening of urban and rural imbalances*. In other words, policies should aim at enhancing the success of both rural migrants and non-migrants alike, ensuring that cities have the capacity to absorb migrants.

The survey has also identified some *data issues* and some *topics which merit further investigation*:

It is clear that the study of internal migration suffers from a lack of appropriate datasets. Future research will be much improved if it can

(i) Better characterize internal migration flows and stocks. It would be very useful to have databases on internal migration by education in a selection of developing countries, complementing the work of Docquier and Marfouk (2005) who recently built such a database for international migration. This would enable researchers to compare the phases of the urbanization and migration process across countries, which is crucial since policy recommendations can differ according to the context.

(ii) Use *panel micro datasets*. This will help address several standard econometric problems, as well as improve the economic understanding of a process which

takes time and whose effects are spread out over time. For instance, with such data, duration models could be tested to study the employment and unemployment spells of workers following migration. It would also be highly desirable for researchers to have access to datasets incorporating an economically relevant and sufficiently fine *spatial identifier* that would enable researchers to better study the workings of local labor markets (since interactions probably occur at a small geographic level). Such data would also enable the matching of different sources and enable researchers to better take into account the local contexts of both origin and destination areas. In this respect, surveys with information on both areas of origin and areas of destination (for instance village studies matched with a sample of migrants originating from the area) should prove very useful. Building such datasets is costly but it is important to gain a sufficiently fine understanding of the migration process to make it beneficial.

Without being exhaustive, the following topics emerge as important for future research:

(i) There is a need to identify *which individual, contextual, or even institutional factors can make migration succeed* or fail. The role of education in accelerating the assimilation of migrants to the labor market has been shown. It remains to be investigated whether education acquired in the place of origin or in the place of destination is more helpful, and how the assimilation of uneducated workers could be enhanced.

(ii) Another important issue concerns the *minimum level of urban public services* which should be provided to migrants, considering that public goods are congestible, that migrants may not have the capacity to finance their shares, but that public services can be key in initiating successful assimilation.

(iii) Research is also needed to investigate which *types of labor-market intermediation* would be more efficient in matching the rural supply and the urban demand for labor. This would involve studying in more detail how migrants find their jobs but also the impact of job-search methods on the occupations they find. One related issue would be whether migrants are

efficiently distributed across jobs and industries. If this is the case, then policies should only aim at facilitating the matching process, but if not, then policies should also try to channel migrants towards particular industries.

(iv) Another line of research which deserves to be pursued concerns the relationship between migration and *rural development*. How is rural development affected by alternative modes of migration such as circular or temporary migration? Does circular migration result in more money injected in the rural economy (or in money better invested) than permanent migration to cities? Does circular migration enable more contacts between successful migrants and rural dwellers creating a virtuous dynamic? Determining which type of rural development is more likely to be successful also remains on the agenda. In particular, what should be the balance between stimulating on-farm vs off-farm activities?

(v) The economic and social consequences of the gender imbalance in migration flows would also need to be studied.

(vi) Finally, the interplay between internal and international migration deserves closer scrutiny. Because of the selectivity between internal and international migrants, the contexts and policy implications of the two phenomena can differ. But what are the similarities between the two phenomena? And how can research on internal migration draw from advances in research on international migration?

Appendix

Econometric and methodological problems in migration studies

The imperfection of the data used to study migration is often a source of specific econometric problems. We discuss these issues in order.

An obvious problem lies with the relevant *measure of income* to be used in migration-decision models. In the income differential perspective, the variable explaining migration is the difference in the discounted expected streams of real income. Wages are only considered as proxies for the present value of income flows or for permanent income and are typically used in regressions such as (3.3'), (3.3'') or (3.4''). Not only is the use of wages as a proxy debatable, but earnings may be biased with measurement error, especially in rural areas. In all rigor, incomes should be corrected for remittances potentially paid or received. Moreover, it is real wages that should be used in the estimations and not nominal wages, but coming up with a relevant local cost of living to deflate nominal wages can be problematic. Finally, it is worth stressing that the migration decision could be specified as a function of the difference in expected wages (and not just wages), especially when the stylized facts confirm that many workers migrate before having found a job. Unfortunately, standard datasets seldom provide information on workers' pre-migration earnings expectations.

In addition, the *specification of the migration-decision process* can be incomplete if the migration equation only includes wage differentials and individual characteristics. This is because, in the real world, migration decisions are based on utility differences between regions and not just wage differences. Since high wages (resp. low wages) could compensate for unpleasant local amenities (resp. pleasant local amenities), only non-amenity compensating wage differentials across regions should correspond to utility differentials that can induce migration. Omitting regional amenities in the estimated model can induce a correlation between the error term and wages, biasing the

estimations. Furthermore, it is all the more important to control for local amenities as there are often dramatic differences in the provision of public services between rural and urban areas in developing countries. Another important specification problem is that changes in personal characteristics which can explain migration (for instance getting married) might be endogenous. The use of bivariate probits to simultaneously model the two events can be a way to address this issue. For instance, Osberg, Gordon and Li (1994) use a bivariate probit to study interindustry labor mobility and interregional migration in Canada, which they view as simultaneously determined processes.

Another recurrent econometric problem is the use of *biased datasets*. As Greenwood (1997) observes, this can happen when working on administrative files, for instance if only those with sufficient income are required to file an income tax form. The problem remains with panel data because of panel attrition (if there are systematic unobserved differences between individuals who remain in the panel and those who disappear, and if these characteristics also explain the dependant variable). Similarly, if the two dates between which migration is measured are too far apart (more than 1 year for instance), return migrants may be censored from the sample and this selection might bias the estimates if only those who succeeded stayed in the urban area of destination. Another source of selectivity is that the nature of self-selection may change over time. This can happen, for instance, if the average quality of migrants is lower under favorable economic conditions (Pissarides and Wadsworth, 1989). In any case, this issue should be addressed when comparing migration outcomes from different periods (as in Borjas, Bronars and Trejo, 1992). More generally, the use of datasets not aimed at studying migration or the use of non-random community case studies are problematic (see World Bank, 2005).

In any case, *panel data is to be preferred over cross-section data*. One good reason to use panel data is that it allows to address the classical endogeneity issues (for instance due to unobserved characteristics) by working on differences. But panel data are also particularly relevant to investigate the consequences of migration over time. Particular issues such as whether migrants might at first accept a drop in earnings anticipating a

wage growth in later periods can only be addressed with panel data which provide information on the income streams associated with migration. However, the use of panel data does not solve all problems: if the data used is censored to the right and too recent relative to the time of migration, one might underestimate the lifetime returns to migration.

Lastly, since migration is about movements from one place to another, the way places are *spatially delineated* cannot be neutral in the analysis. The researcher should wonder what the relevant spatial breakdown could be, and if the predefined areas more or less correspond to independent local labor markets. At one extreme, broad-scale studies focusing on the movements between one aggregate heterogeneous region called ‘urban areas’ and another one called ‘rural areas’ may be misleading and can shed only little light on the actual migration process.

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